

METHOD AND APPARATUS FOR CONTROLLING THE PERFORMANCE  
OF A SUPPLEMENTARY PROCESS AT A POINT-OF-SALE TERMINAL

5 The present application is a continuation-in-part application of (i) co-pending Patent Application No. 08/920,116, entitled METHOD AND SYSTEM FOR PROCESSING SUPPLEMENTARY PRODUCT SALES AT A POINT-OF-SALE TERMINAL, filed on August 26, 1997, which is a continuation-in-part of co-pending Patent Application No. 08/822,709, entitled SYSTEM AND METHOD FOR PERFORMING LOTTERY TICKET TRANSACTIONS UTILIZING POINT-OF-SALE TERMINALS, filed on March 21, 1997; and  
10 (ii) co-pending Patent Application No. 08/841,791, entitled METHOD AND APPARATUS FOR SELLING SUBSCRIPTIONS TO PERIODICALS IN A RETAIL ENVIRONMENT, filed on May 5, 1997, each of which are incorporated herein by reference.

CROSS REFERENCE TO CO-PENDING APPLICATIONS

15 The present invention is related to the following United States Patent Applications filed contemporaneously herewith:

20 U.S. Patent Application Ser. No. 09/045,036, entitled METHOD AND APPARATUS FOR FACILITATING THE PLAY OF FRACTIONAL LOTTERY TICKETS UTILIZING POINT-OF-SALE TERMINALS (~~Attorney Docket No. WD2-97-558~~), U.S. Patent Application Ser. No. 09/045,518, entitled METHOD AND APPARATUS FOR PROCESSING A SUPPLEMENTARY PRODUCT AT A POINT-OF-SALE TERMINAL (~~Attorney Docket No. WD2-97-561~~), U.S. Patent Application Ser. No. 09/045,084, entitled METHOD AND APPARATUS FOR CONTROLLING OFFERS THAT ARE PROVIDED AT A POINT-OF-  
25 SALE TERMINAL (~~Attorney Docket No. WD2-97-564~~), and U.S. Patent Application Ser. No. 09/045,347, entitled METHOD AND APPARATUS FOR PROCESSING A SUPPLEMENTARY PRODUCT SALE AT A POINT-OF-SALE TERMINAL (~~Attorney Docket No. WD2-97-559~~), each assigned to the assignee of the present invention and incorporated by reference herein.

## FIELD OF THE INVENTION

The present invention relates to point-of-sale terminals, and, more specifically, to methods and apparatus for controlling the performance of supplementary processes at point-of-sale terminals.

## BACKGROUND OF THE INVENTION

Point-of-sale ("POS") terminals, such as cash registers, are used in a wide variety of businesses for performing such processes as calculating the total price of a purchase (goods or services) and calculating the amount of change due to a customer. Some POS terminals furthermore track items sold and adjust a database of store inventory accordingly.

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A POS terminal may perform a supplementary process in addition to performing the processes listed above. A supplementary process can increase sales, and thereby increase the average profit gained per transaction. One such supplementary process is described in a parent application of the present application, Patent Application No. 08/920,116, entitled METHOD AND SYSTEM FOR PROCESSING SUPPLEMENTARY PRODUCT SALES AT A POINT-OF-SALE TERMINAL, filed on August 26, 1997. Described therein is a supplementary process in which a customer at a POS terminal is offered an "upsell" in exchange for an amount of change due. The POS terminal determines an upsell in dependence on a purchase of the customer, and also determines an upsell price (the amount of change due) based on the purchase. For example, a customer purchasing a first product for \$1.74 and tendering \$2.00 may be offered a second product in lieu of the \$0.26 change due. The upsell price, \$0.26, thus depends on the purchase price \$1.74.

Another supplementary process is a computer-determined "suggestive sell". U.S. Patent No. 5,353,219 describes a system for suggesting items for a customer to purchase from a primary category at conventional item prices. Still another supplementary process is described in a parent application of the present application, Patent Application No. 08/841,791, entitled METHOD AND APPARATUS FOR SELLING SUBSCRIPTIONS TO PERIODICALS IN A RETAIL ENVIRONMENT, filed on May 5, 1997. Described therein is a supplementary process

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in which a customer purchasing an issue of a periodical at a POS terminal is offered the opportunity at that time to purchase a subscription to that periodical.

Such supplementary processes may be performed solely within the POS terminal itself. For example, a cash register may be programmed to calculate an amount of change due, and  
5 determine an upsell to offer in exchange for the change due. Alternatively, the supplementary process may be performed with the assistance of a device in communication with the cash register. For example, a remote server computer connected to the cash register via a communications network may determine an upsell to offer in exchange for the change due.

A supplementary process performed at a POS terminal may undesirably slow the rate at  
10 which customer transactions are completed. For example, it may take several seconds for a cashier operating a POS terminal to offer a customer an upsell in exchange for an amount of change due, and for the customer to decide whether to accept such an offer. Offering a customer a choice of several upsells in exchange for an amount of change due could impose yet further delays on completing customer transactions.

15 Such delays may be acceptable under some conditions, yet unduly burdensome under other conditions. For example, during lunch or other times of day, there may be a long line at a POS terminal. It would be inadvisable to add to the wait of each customer in line by performing a supplementary process as well. However, eliminating the supplementary processes may speed the completion of customer transactions, but at the cost of the extra profit derived from such  
20 supplementary processes. Accordingly, a need exists for controlling the performance of supplementary processes at POS terminals.

#### SUMMARY OF THE INVENTION

25 It is an object of the present invention to provide a method and apparatus for controlling the performance of a supplementary process at a point-of-sale terminal.

In accordance with the present invention, one or more POS terminals measure one or more criteria, such as the activity rate of the POS terminal. For example, the POS terminal may measure the number of completed transactions per period of time, the number of items purchased  
30 through the POS terminal per period of time, the number of upsells accepted by customers per period of time, the number of customers in a store or the number of customers in the vicinity of the POS terminal. The POS terminal in turn compares the measured criteria with a

predetermined threshold. Based on the results of the comparison, the POS terminal determines whether to perform a supplementary process. For example, the POS terminal may perform the supplementary process only if the number of transactions per minute is less than a predetermined threshold.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic illustration of a POS terminal provided in accordance with the present invention.

10 FIG. 2 is a schematic illustration of another embodiment of the POS terminal of FIG. 1.

FIG. 3 is a flow chart illustrating a method provided in accordance with the present invention for controlling the performance of a supplementary process at a POS terminal.

FIG. 4 is a table illustrating an offer schedule that depends on an activity rate of a POS terminal.

15 FIG. 5 is a schematic illustration of an override decision manager of the POS terminal of FIG. 2.

FIG. 6 is a schematic illustration of a network of POS terminals.

FIG. 7 is a table illustrating an offer schedule that depends on an activity rate of a plurality of POS terminals.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Applicants have recognized that supplementary processes performed by POS terminals may introduce delays in the completion of customer transactions, and that these delays may be acceptable under certain circumstances. For example, when there are few pending customer transactions, such delays do not significantly affect relevant measures of performance such as sales per hour or profit per hour.

Accordingly, performing supplementary processes during periods of low activity, yet reducing or refraining from supplementary processes during periods of high activity, can result in increased profit. Such increased profit can exceed the profit of POS terminals that either always perform the supplemental process or never perform the supplemental process.

30 In one embodiment of the present invention, a POS terminal measures one or more criteria, such as an activity rate of a terminal, and performs a supplementary process if the

criteria are less than predetermined thresholds. In another embodiment, a POS terminal measures an activity rate of a terminal, determines an offer schedule in accordance with the activity rate, and in turn provides a supplementary product offer in accordance with the offer schedule. The offer schedule may specify that time-consuming offers (offers with a low "offer speed") are made during periods of low terminal activity, while quicker offers (offers with a high "offer speed") are made during periods of higher terminal activity.

It is particularly desirable to provide an offer to exchange spare change due for an upsell, as described in the aforementioned parent application, Application No. 08/920,116.

Accordingly, the present invention contemplates providing offers for upsells having high performance rates. In addition, the present invention contemplates providing offers for different upsells in accordance with an offer schedule.

Referring to FIG. 1, a POS terminal 10, which may be the IBM 4683 or IBM 4693 manufactured by International Business Machines, comprises a processor 12, such as one or more conventional microprocessors. The processor 12 is in communication with a data storage device 14, such as an appropriate combination of magnetic, optical and/or semiconductor memory. The processor 12 and the storage device 14 may each be (i) located entirely within a single computer or other computing device; (ii) connected to each other by a remote communication medium, such as a serial port cable, telephone line or radio frequency transceiver; or (iii) a combination thereof. For example, the POS terminal 10 may comprise one or more computers which are connected to a remote server computer for maintaining databases.

An input device 16 preferably comprises a keypad for transmitting input signals, such as signals indicative of a purchase, to the processor 12. A printer 18 is for registering indicia on paper or other material, thereby printing receipts, coupons and vouchers as commanded by the processor 12. A display device 20 is preferably a video monitor for displaying at least alphanumeric characters to the customer and/or cashier. Many types of input devices, printers and display devices are known to those skilled in the art, and need not be described in detail herein. The input device 16, printer 18 and display device 20 are each in communication with the processor 12.

A sensor 22 is also in communication with the processor 12. The sensor 22 and processor 12 may be used to measure, for example, the number of customers entering a store or

the number of customers in the vicinity of the POS terminal 10. Many other types of sensors are known and need not be described in detail herein.

5 The storage device 14 stores a program 24 for controlling the processor 12. The processor 12 performs instructions of the program 24, and thereby operates in accordance with the present invention, and particularly in accordance with the methods described in detail herein. The program 24 furthermore includes program elements that may be necessary, such as an operating system and "device drivers" for allowing the processor to interface with computer peripheral devices, such as the input device 16, the printer 18, the display device 20 and the sensor 22. Appropriate device drivers and other necessary program elements are known to those skilled in the art, and need not be described in detail herein.

FIG. 2 illustrates another embodiment of the POS terminal 10 of FIG. 1, in which a control device 28 is in communication via a communication medium 30 with a system 32 for providing a supplementary process. The control device 28 comprises a processor 34 in communication with the input device 16 and the display device 20. The system 32 for providing a supplementary process comprises a processor 36 in communication with the storage device 14, the printer 18 and the sensor 22. In this embodiment, the control device 28 may be a cash register, and the system 32 may be an electronic device connected thereto for printing coupons in accordance with data received from the cash register. Other configurations of the POS terminal 10 will be understood by those skilled in the art.

20 Referring to FIG. 3, a method 40 for controlling the performance of a supplementary process initiates with the POS terminal 10 of FIGS. 1 and 2 measuring one or more criteria, such as the activity rate of the POS terminal 10 (step 42). For example, the POS terminal 10 may measure the number of completed transactions per time (transaction rate), the number of items purchased through the POS terminal 10 per period of time (item sale rate), or the number of upsells accepted by customers per period of time (upsell acceptance rate). The POS terminal 10 may measure the number of customers, such as the number of customers in a store or the number of customers in the vicinity of the POS terminal 10, through input signals received from the sensor 22. Many other types of measurements may be made by the POS terminal 10.

30 The POS terminal 10 then determines, based on the measured activity rate or other criteria, whether to perform a supplementary process, such as offering an upsell in exchange for change due. In one embodiment, the POS terminal 10 compares the activity rate to a

predetermined threshold. Such a threshold may be determined (step 44) in a number of ways. For example, the threshold may be a predetermined value (e.g. a rate of three transactions per minute), or a variable value (e.g., three transactions per minute after 5:00 PM, two transactions per minute otherwise). Many methods of calculating thresholds, based on many variables such as time of day and day of the week, will be understood by those skilled in the art.

Once the threshold is determined, the activity rate is compared to the predetermined threshold (step 46). One comparison is to determine whether the activity rate is less than the threshold. For example, the POS terminal 10 may determine whether the measured number of completed transactions in the last ten minutes is less than a predetermined threshold of seven transactions per ten minute period.

If the comparison is valid, (e.g., the measured activity rate is less than the threshold), then the POS terminal 10 performs the supplementary process (step 48). The POS terminal 10 may perform the supplementary process by executing instructions of the program 24 (FIG. 1). Alternatively, the POS terminal 10 may perform the supplementary process by sending control signals from the control device 28 (FIG. 2) to the system 32 for providing a supplementary process. In such an embodiment, the control device 28 determines whether to enable or disable the system 32. For example, the control device 28 may disable the system 32 if the activity rate is greater than a predetermined threshold, and enable the system 32 if the activity rate is less than the predetermined threshold. The control device 28 may enable and disable the system 32 by transmitting thereto appropriate enable signals and disable signals. Such signals may be control signals, which serve only to enable or disable the performance of the supplementary process, or may be data signals, which contain additional information for use by the system 32. Instead of separate enable and disable signals, the control device 28 may transmit to the system 32 a signal that toggles the system 32 between an enabled mode and a disabled mode.

It will be understood by those skilled in the art that the system 32 may alternatively be "enabled-until-disabled". In other words, the control device 28 would only need to transmit a disable signal when the supplementary process is not to be performed. When no disable signal is transmitted to the system 32, the system 32 would perform the supplementary process (even if no enable signal is received). Similarly, the system 32 may be "disabled-until-enabled". In other words, the control device 28 would only need to transmit an enable signal when the supplementary process is to be performed. When no enable signal is transmitted to the system

32, the system 32 would not perform the supplementary process (even is no disable signal is received).

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As an illustration of the above-described method 40, the POS terminal may measure an activity rate, and determine if the activity rate is less than a predetermined threshold. If so, the POS terminal then determines an upsell in dependence on a purchase, as described in a parent application of the present application, Patent Application No. 08/920,116, entitled METHOD AND SYSTEM FOR PROCESSING SUPPLEMENTARY PRODUCT SALES AT A POINT-OF-SALE TERMINAL, filed on August 26, 1997. The POS terminal further determines an upsell price in dependence on the purchase, and offers the customer an upsell in exchange for the upsell price.

In the above-described embodiments, the POS terminal 10 determines whether a supplementary process is or is not performed. In other embodiments, the POS terminal 10 may further select a supplementary process based on the measured activity rate or other criteria. For example, it may be desirable that different types of offers are provided to customers depending on the activity rate of the POS terminal. In particular, more time-consuming offers are provided when the measured activity rate is low, while quicker offers are provided when the measured activity rate is high.

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FIG. 4 is a table 60 that illustrates an offer schedule, which may be implemented as a database stored on the storage device 14 in a manner well known in the art. Each row of the table 60 represents an entry, and each entry defines an upsell to offer for an activity rate. In particular, each entry includes an activity rate identifier 62 that uniquely identifies the entry, an activity rate 64 which describes a rate or range of rates, and an upsell to offer 66 at that activity rate. As described in Patent Application No. 08/920,116, the upsell to offer 66 may include two or more upsells which are offered one at a time until an upsell is accepted.

An entry 68, corresponding to activity rates less than eight transactions per fifteen-minute period, indicates that an additional product is to be offered during these (relatively low) activity rates. Additional product offers typically have low "offer speeds", since it may be several seconds for a cashier to retrieve the additional product if the offer is accepted by the customer. An entry 70, corresponding to activity rates between eight and fifteen transactions per fifteen-minute period, indicates that a "triple-your-change" coupon is to be offered during these activity rates. Typically, printing a coupon is quicker than offering an additional product. A coupon



offer thus has a higher offer speed, which is why a coupon is to be offered during periods of higher terminal activity. An entry 72 indicates that no offer is to be provided at activity rates greater than fifteen transactions per fifteen-minute period.

The above embodiments describe how the POS terminal automatically controls the performance of a supplementary process. It may further be desirable to provide a method and apparatus to, at times, counteract such automatic control. Allowing a manual override of the decision of the POS terminal would provide even finer control over the performance of the supplementary process. For example, a store manager may wish to test the supplementary process, even though the POS terminal is not currently performing the supplementary process. In addition, there may be certain situations, which a device cannot accurately account for, in which a supplementary process should not be performed.

Referring to FIG. 5, an apparatus 80 includes an override decision manager 82 which receives input from an override signal circuit 84 and from an automatic control signal circuit 86. The override signal circuit 84 is a device that provides an override signal, such as a switch in communication with the POS terminal. The override signal circuit 84 may be one or more keys on the input device 16 (FIGS. 1 and 2), or may be another device that transmits and/or generates signals. The automatic control signal circuit 86 is the portion of the POS terminal that provides the control signal for controlling automatic performance of the supplementary process, as described above. The override decision manager 82 receives the override signal and control signal from circuits 84 and 86, respectively, and generates in dependence thereon an "enhanced control" signal for controlling performance of the supplementary process. The enhanced control signal is transmitted to a system 88 for performing a supplementary process. The system 88 may be a software module which is a component of the POS terminal 10 of FIG. 1, or may be the system 32 for providing a supplementary process of FIG. 2.

The override signal may be used to counteract the performance of the supplementary process that would have otherwise occurred in accordance with the control signal from the automatic control signal circuit 86. Referring to Table 1 below, the Truth Table shown describes the output (Enhanced Control Signal) as a function of the inputs (Override Signal and Control Signal). Table 1 describes an embodiment where the override signal may attain one of two values (i.e., 0 or 1). However, those skilled in the art will understand that the override signal may attain more than two values.

| Override Signal | Control Signal | Enhanced Control Signal |
|-----------------|----------------|-------------------------|
| 0               | 0              | 0                       |
| 0               | 1              | 1                       |
| 1               | 0              | 0                       |
| 1               | 1              | 0                       |

where:

Override Signal = 0 for Allowing Automatic Control

5 Override Signal = 1 for Disabling the Supplemental Process

Control Signal = 0 for Disabling the Supplemental Process

Control Signal = 1 for Enabling the Supplemental Process

10 Enhanced Control Signal = 0 for Disabling the Supplemental Process

Enhanced Control Signal = 1 for Enabling the Supplemental Process

TABLE 1 – Truth Table for Override Decision Manager

15 For example, when Override Signal = 1 and Control Signal = 1, then a user is overriding the automatic determination to enable the supplemental process. Accordingly, the Enhanced Control Signal = 0, and the supplemental process is disabled.

Referring to FIG. 6, a network 100 includes a server computer 102 in communication with POS terminals 104, 106 and 108. The server computer 102 may itself be a POS terminal, as  
20 described above. Although three POS terminals are shown in FIG. 6, any number of POS terminals may be in communication with the server computer 102 without departing from the spirit and scope of the present invention. The server computer 102 may perform many of the above-described processes, especially those processes which are performed for more than one POS terminal. For example, the server computer 102 may (i) measure the activity rate of any or  
25 all of the POS terminals 104, 106 and 108, (ii) determine whether to provide a supplementary process at any or all of the POS terminals 104, 106 and 108, (iii) enable or disable one or more

systems for providing a supplementary process, and/or (iv) transmit an override signal to any or all of the POS terminals 104, 106 and 108. The server computer 102 may also collect data from the POS terminals 104, 106 and 108, thereby aggregating information about the processes that each POS terminal performs. For example, each POS terminal may measure its own activity rate, and transmit to the server computer 102 signals indicative of the measured activity rate. The server computer 102 may then determine an overall activity rate for the network 100 of POS terminals.

The measured activity rate may be, for example, the number of POS terminals in use (processing transactions) or the percentage of POS terminals in use. Based on the activity rate, the server computer 102 may determine whether to permit the supplementary process to be performed at each POS terminal. Alternatively, the server computer 102 may determine which of the POS terminals are to perform the supplementary process.

FIG. 7 shows a table 120 that illustrates an offer schedule for a network of POS terminals. Each row of the table 120 represents an entry, and each entry defines an upsell to offer for an activity rate. The activity rate used in the table 120 is based on which of a plurality of terminals are in use. Each entry includes an activity rate identifier 122 that uniquely identifies the entry, an activity rate 124 which describes a rate or range of rates, and an upsell to offer 126 at that activity rate. For example, the entry 128, corresponding to less than 50% of all POS terminals in use, indicates that three products are to be offered, and the customer is to choose one. The entries 130, 132 and 134 similarly describe upsells to be offered for different activity rates. As described above, more time-consuming upsells such as multiple upsells offered one after the other may be offered during periods of lower activity.

Although the present invention has been described with respect to a preferred embodiment thereof, those skilled in the art will note that various substitutions may be made to those embodiments described herein without departing from the spirit and scope of the present invention.